DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name:	ASARCO Inc. / Globe Plant
Facility Address:	495 East 51st Avenue, Denver, Colorado
Facility EPA ID #:	COD007063530

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

____ If no - re-evaluate existing data, or

____ if data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			As demonstrated by years of monitoring data.
Air (indoors)[2]		X		The contaminants are not volatile.
Surface Soil (e.g., <2 ft)	X			As demonstrated by sampling data.
Surface Water	X			Minor impacts: see EI for ground water releases.
Sediment		X		No evidence of accumulation in S. Platte R. sediments. Likihood very low.
Subsurf. Soil (e.g., >2 ft)	X			As demonstrated by sampling data.
Air (outdoors)		X		The contaminants are not volatile.

____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Ground Water: Years of sampling data show that ground water both on and off-site is contaminated with the heavy metals **arsenic**, **cadmium**, and **zinc** at concentrations in excess of established State of Colorado ground water standards. The standards are 0.05 mg/L, 0.005 mg/L, and 5.0 mg/L respectively. These standards have also been incorporated into the August 6, 1993 "Final Consent Decree/Order" (Civil Action No. 83-C-2383) which governs the cleanup process implemented at the site.
Surface & Subsurface Soil: Large numbers of soil samples have been collected from both on-site and off-site locations, defining the distribution of contaminants across the local community. In general surface and subsurface contamination is present on-site, while only shallow soil contamination is found off-site. The cleanup standards for this site are 70 mg/kg for As with a "buffer" level of less than 28 mg/kg for residential soil, 73 mg/kg or less for Cd, 500 mg/kg or less for lead, and 500 mg/kg or less for Zn in garden soil. These standards have also been incorporated into the August 6, 1993 "Final Consent Decree/Order". See the 1994-2000 Design Investigation Report for the Community Soils and Vegetable Gardens Operable Unit.
Surface Water: Ground water monitoring wells located upgradient of where surface water and ground water converge contain heavy metals at concentrations slightly above the State ground water standards. Contaminant concentrations in surface water samples collected from the South Platte River where it intercepts the ground water plume are also well below the appropriate ground water standards and are also below the standards established in the August 6, 1993 "Final Consent Decree/Order". However, cadmium concentrations measured in a few surface water samples are slightly in excess of the most recent surface water aquatic standard for this contaminant, a value that came into effect after the August 6, 1993 "Final Consent Decree/Order" was signed.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	NO	NO	NO	NO			NO
Air (indoors)	NO	NO	NO				
Soil (surface, e.g., <2 ft)	YES	YES	YES	NO	YES	NO	NO
Surface Water	NO				NO	NO	NO
Sediment	NO	NO			NO	NO	NO
Soil (subsurface e.g., >2 ft)				NO			NO
Air (outdoors)	NO	NO	NO	NO	NO		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

X If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Potential exposures are limited to surface soil, with even fewer possibilities for exposure to subsurface soil. Ground water is not used in the area and future use has been prohibited. Contaminants do not exceed health-based standards in surface water. There is not known accumulation of heavy metals in sediment. The constituents of concern are not volatile and therefore vapors are not inhaled. See the 1989 Risk Assessment for the Asarco Globe Plant.

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

X If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

The soil concentrations of contaminants are, at some locations, above health-based levels calculated using risk assessment methods employing current and reasonably expected exposure scenarios. These health-based standards have been established in the August 6, 1993 Consent Decree; Civil Action No. 83-C-2383; State of Colorado v. Asarco Inc. Exposures are limited to surface soil for the following groups: residents, site workers, construction workers and trespassers. The exposures are not expected to be significant because:

Residents: Private properties affected by the remediation have either been remediated or are in the process of being remediated (three more years to remediate all residential properties and two more years for commercial properties).

Site Workers: On-site areas have either been remediated (capping of affected areas with cleaner soil) or access to them is prohibited.

Construction workers: On-site areas have either been remediated (capping of affected areas with cleaners oil) or access to them is prohibited, while for off-site locations remediation is complete, underway or the exposure to contamination is not significant to present a risk.

Trespassers: The facility is in the process of capping areas that exceed the trespasser levels with cleaner soil.

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially

"unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

X If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

See response to the previous question.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the ASARCO Inc. facility, EPA ID # COD007063530, located at 495 East 51st Avenue, Denver, Colorado under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by	(signature)		Date 7-12-00
	(print)	Walter Avramenko	
	(title)	Unit Leader, Hazardous Waste Corrective Action Unit	
Supervisor	(signature)		Date 7-12-00
	(print)	Walter Avramenko	
	(title)	Unit Leader, Hazardous Waste Corrective Action Unit	
	(EPA Region or State)	Colorado	

Locations where References may be found:
Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
HMWMD-B2
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Contact telephone and e-mail numbers

(name)	Fonda Apostolopoulos
(phone #)	(303) 692-3411
(e-mail)	fonda apostolopoulos@state.co.us

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.